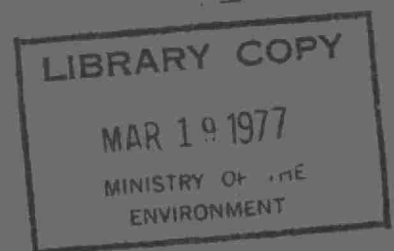


SURVEY OF THE TOWN CREEK CITY OF TIMMINS



Ontario

Ministry
of the
Environment

North-Eastern Region
R. E. Moore
Regional Director

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SURVEY OF THE TOWN CREEK

CITY OF TIMMINS

May & August 1975
Municipal & Private Abatement
Timmins District
Northeastern Region

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INTRODUCTION

The initial work of a water pollution survey of Town Creek was conducted on May 26th and 28th, 1975 by two members of the Municipal and Private Abatement staff of the Ministry of the Environment Office in Timmins.

The purpose of the survey was to locate and sample all flows entering the creek, so that any sources of pollution could be identified.

Bacteriological samples were taken at 36 points along the creek from the point at which it enters the Mattagami River upstream to the storm sewer pipes entering from Brian Ave. and beyond to the swamp. Routine chemical, heavy metal and phenol samples were taken at five of the sampling points along the creek to test for pollution from sources other than human and animal waste. Follow-up bacteriological samples were taken on June 25th and again on August 13th at the sample points which had faecal counts in excess of 100 per 100 ml to establish whether or not the elevated levels were normal.

SUMMARY AND CONCLUSIONS

From the results of this pollution survey conducted over the summer of 1975, it must be concluded that 19 of the 31 storm sewers or ditches entering Town Creek are carrying some domestic sewage. Flow within the creek is not significantly diluting the sewage entering it, with the result that Town Creek water entering the Mattagami River is bacteriologically contaminated.

Of the ten storm sewers entering the creek between the mouth and Theriault Blvd. not one was free of significant faecal contamination. Total coliform counts indicative of raw sewage were received from storm sewers entering at Mattagami Blvd. (TC-101), Fogg St. (TC-103), Young and Wilson (TC-105) and Algonquin Blvd. (TC-108). Excessive faecal coliform counts were recorded at Young and Wilson (TC-104) and Algonquin Blvd. (TC-108). Coliform counts at these sample points exceeded the total and faecal count limits of 80,000 and 8,000 per 100 ml. Between Theriault Blvd. and Waterloo St., another seven storm sewers carrying highly contaminated water join the creek. Water in the ditch draining storm sewers along Sixth Ave. (TC-115) and 3 storm sewers; one at Vimy Ave. (TC-117), a second at Polaris Ave. (TC-121), and a third at Waterloo St. (TC-122) all contained total and faecal coliforms above the count limits of 80,000, 8,000 per 100 ml. Two other storm sewers at Pearl Ave. (TC-118) and Hillside Ave. (TC-119) also recorded high coliform counts.

Water flowing from the seventh storm sewer (TC-122B) at Theriault Blvd. was tested only once. The coliform count at that time exceeded the limit for recreational waters.

The final two sample points with elevated coliform counts were located between Waterloo St., and the source; at MacLean Drive (TC-125) and Brian Avenue (TC-134).

In terms of the general bacteriological condition of the creek water, it was poor, particularly below Vimy Avenue. Mid-Creek samples taken below this point had coliform counts of 3300, 3300; 22,000, 3600; 21,000, 3200; and 80,000⁺, 5300.

Chemical analysis indicated that the mid-creek water was chemically satisfactory. BOD₅ did not exceed 1 ppm on any sample. Total kjeldahl nitrogen and phosphorus did not exceed 1 ppm. Suspended solids were generally low, only one sample had a solids concentration greater than 15 ppm. Conductivity alone was high. In 4 out of the 5 samples, conductivity was greater than 900 umhos/cm.

Phenol analysis indicated that the creek was relatively free of contamination by phenolic compounds. All phenol results were less than 1 ppb.

The concentration of certain heavy metals increased as the creek water flows from its source. This increase was noted in the concentration of copper, zinc, lead and particularly manganese. Copper, lead and zinc, are metals associated with the Texasgulf Sulphur, Kidd Creek operation. It was originally considered that these metals might be carried through the air as dust and be falling on the city. According to Mr. P. I. Williams, District Officer for Industrial Abatement, Texasgulf could not be the source. Evidence of fallout from the Texasgulf concentrator operation has not been found any closer than the Pamour Mine.

To get fallout over the City of Timmins would require a continual wind coming from the east. The prevailing wind in this area is from the north west and south west.

It has been suggested that the source of the copper, lead and zinc could be sanitary sewers which are still connected to storm sewers. Copper pipes and plumbing systems will produce concentrations of copper, lead and zinc in excess of those recorded.

Manganese is the only metal which is difficult to account for. Manganese is not associated with Texasgulf or with plumbing installations. It is the concentration of manganese which exhibits the most marked increase.

Considering the high bacteriological results and the increase in the concentration of certain metals, the results of the survey would seem to indicate that sanitary sewers and private pipes are linked to storm sewers in several areas of Timmins. These storm sewers are then carrying sewage to Town Creek. The bacteriological counts obtained far exceed the permissible level for surface waters in Ontario and are indicative of a potential health hazard.

GENERAL

(I) Location

Town Creek flows from a point to the northeast of Timmins proper crossing the former Town of Timmins border where Brian Ave. meets Hart St. The creek flows in a south westerly direction to the Mattagami River entering the river between Commercial and Main Avenues.

The average creek width is 3 to 4 feet, narrowing to less than two feet in places. At the mouth, the widest point, the creek bed is approximately 10 feet across.

At the time of the May survey the water was low, varying from approximately 18 inches at the deepest point to 6 inches or less in most places. The water level was much the same in June. By August the continuous hot dry weather experienced during the summer had dried the creek considerably. The creek bed was exposed in many places and the water ranged in depth from approximately 1 to 14 inches. No attempt was made to ascertain the high water level.

(II) Drainage Area

Town Creek serves as a drainage basin for storm sewers in the City of Timmins. These storm sewers drain some 3 square miles of Timmins proper in addition to draining Gillies Lake. Gillies Lake drains other storm sewers and ditches along Toke St., James Ave., Park Road and Algonquin Blvd., increasing the total Town Creek drainage area to approximately 4.5 square miles. In terms of footage, a minimum of 17 miles of storm sewer pipes carry flow to the creek.

The area draining into Town Creek is bordered on the east by Toke St., Gillies Lake and the Ontario Northland Railway tracks. On the west, drainage includes the Dieppe St. vicinity, Belleview Ave. and Theriault Blvd. as far north as O'Neill Ave.. The southern boundary includes all of Second Ave., and Commercial Ave., with some drainage of Birch St. and Mountjoy St.. The old Town of Timmins limit is the northern extent of the drainage as far west as Eyre Blvd..

The land drained by the storm sewers flowing to Town Creek is used for residential as well as commercial purposes. The major commercial district along Algonquin Blvd., E., Third and Second Avenues drain to the creek as does most of the residential area in the northeast corner of the old Town of Timmins. There are 27 storm sewer and 4 ditch entry points along the creek. The four ditches serve as connecting links between storm sewers and the main creek flow.

(III) Weather at the Time of the Survey

The week preceeding the May survey was continuously hot with the daily mean temperature averaging 69°F. The weather was broken by evening showers on the night of May 25th and again on May 27th. The average precipitation for the seven day period prior to the survey was 0.16 inches.

The weather preceeding the June 25th sampling was similar to that of May in terms of temperature. The daily mean again averaged 69°F, average precipitation was 0.016 inches.

The daily mean average temperature proceeding the August 13th testing was 64°F, the average precipitation was 0.017 inches.

The sampling days were warm and dry with the exception of August 13th. May 26th and 28th and June 25th recorded no rainfall. August 13th had 0.12 inches. The rain on August 13th temporarily increased the flow from some storm sewer pipes.

The following table sets out the mean temperature and precipitation of the seven day period preceeding each survey day.

Source: Ministry of Transportation and Communications

<u>DATE</u>	<u>MEAN TEMPERATURE</u>	<u>PRECIPITATION</u>	<u>Average 7 DAY TEMP.</u>	<u>AVERAGE PREC.</u>
May 19	65° F	0.18"		
May 20	70° F	0.18"		
May 21	72° F	0.15"		
May 22	73° F	—		
May 23	65° F	—	69° F	0.16"
May 24	64° F	0.08"		
May 25	67° F	0.64"		
May 26	68° F	—		
May 27	53° F	0.37"		
May 28	57° F	—		
June 18	71° F	0.13"		
June 19	65° F	—		
June 20	61° F	—	69° F	0.016"
June 21	67° F	—		
June 22	77° F	0.08"		
June 23	73° F	—		
June 24	62° F	—		
June 25	63° F	—		
Aug. 06	56° F	—		
Aug. 07	62° F	—		
Aug. 08	67° F	—		
Aug. 09	67° F	—	64°	0.017"
Aug. 10	62° F	0.02"		
Aug. 11	62° F	—		
Aug. 12	65° F	—		
Aug. 13	68° F	0.12"		

SAMPLING TECHNIQUE

(I) Samples - Type and General Location

The bacteriological samples were taken (wherever possible) directly from storm sewer pipes emptying into the creek. At entry points where the outflow was not sufficient to permit direct sampling, water was taken directly from the creek about one foot downstream of the pipe. Samples to ascertain the quality of the creek water were also taken from the Mattagami River and at points along the creek where no pipes entered.

In total 36 bacteriological, 7 routine chemical, 4 heavy metal and 5 phenol samples were taken during the May survey. In June and August those sample points which had total coliform counts above 1000 or faecal counts above 100 per ml were resampled. The August survey also included samples of mid-creek water and 6 heavy samples for comparison.

(II) Care of Samples

The bacteriological samples were kept cool during the survey and taken to the Provincial Health Laboratory before 4:00 pm on the date of sampling.

Heavy metal, routine chemical and phenol samples were shipped to the Ministry of the Environment Laboratories in Toronto within twenty-four hours of sampling. Phenol and heavy metal samples are preserved to prevent any changes from occurring within the sample. No preservation is needed in the routine chemical samples when analysing for total kjeldahl, conductivity, phosphorus, BOD₅ and suspended solids, and none was used.

(III) Method

The survey team consisted of two Ministry staff. One member of the team was responsible for the actual sampling while the second recorded sample points, observations on the amount of garbage along the shores, a description of all pipes entering the creek (whether in use or not) and any other observations which seemed pertinent. The team walked most of the creek in doing the surveys. There were of course some culverts and swamp areas which could not be traversed. All of the sampling points used by the survey team as well as all storm sewers which flow to the creek were recorded on the map of Town Creek.

SIGNIFICANCE OF TEST RESULTS

All of the bacteriological tests were performed at the Ministry of Health Laboratory in Timmins. The routine chemical, heavy metal and phenol analysis were performed at the Ministry of the Environment Laboratories in Toronto.

BACTERIOLOGICAL EXAMINATION

The bacteriological examination is performed to determine the presence of total and faecal coliform and thus the possible presence of bacteria or micro-organisms which cause disease. Three groups of micro-organisms are generally used as indicators of bacteriological contamination, two of which are identified in the bacteriological test performed by the Health Laboratory; total coliform and faecal coliform.

Total coliform organisms include bacteria originating in the intestines of man and other warm blooded animals as well as those bacteria which are the normal inhabitants of soil and vegetation. The presence of total coliform may indicate many sources of natural and human pollution among them: soil runoff or faecal pollution.

Faecal coliform organisms are those bacteria of purely intestinal origin (animal and human). They are unable to survive outside the warm body for any great length of time; hence, the presence of large numbers of faecal coliform (up to 10,000,000 per 100 mls of sample) indicates recent pollution from a nearby source. Smaller numbers may indicate nearby pollution with counts reduced by dilution or pollution from a distant source.

The bacteriological examination performed by the Ministry of Health yields a count of the total and faecal coliform present at the time of analysis. The count is undertaken to a maximum of 80,000 total and 8,000 faecal per 100 mg/l. Coliform counts in excess of these figures are indicated by a plus sign (i.e. 8,000⁺).

The maximum permissible level for total and body contact recreation is less than 1000/100 mg/l and 100/100 mg/l for total and faecal coliform counts. Although the creek is not used for swimming the survey team noted children playing in the creek during the June and August testings and it does empty into the Mattagami River which offers a swimming area less than 150 yds. downstream from the entry point.

CHEMICAL ANALYSIS

(I) Biochemical Oxygen Demand (BOD)

The BOD test is employed to determine the amount of dissolved oxygen required for the bacterial stabilization of the decomposable organic matter in water. This particular test is performed over a 5 day period at 20°C. in the absence of light. The duration of the test is indicated by the subscript 5 (BOD₅).

The discharge of wastes into natural waters leads to an increase in the demand for dissolved oxygen. An increase in organic material (in the form of wastes) depletes the dissolved oxygen supply and thus inhibits normal aquatic growth. This in turn further inhibits the supply of oxygen and eventually leads to the deterioration of water quality for all uses.

Dissolved oxygen in surface water should exceed 4 mg/l. The desirable level for dissolved oxygen in water is near saturation. The BOD₅ test yields the amount of dissolved oxygen required for the stabilization of wastes in the sample over a five day period. A high BOD₅ indicates too great a demand for dissolved oxygen and therefore the presence of organic matter beyond the ability of the receiving watercourse to assimilate the waste without deterioration.

(II) Suspended Solids

Suspended solids refers to the quantity of material in the water which may be removed by filtration. The test is important for it describes a waste in terms of the amount of material that will settle out. It is not a measure of water clarity.

Suspended solids data is used in evaluating the strength of waste water and in assessing the efficiency of waste treatment procedures.

There is no specific criteria for suspended solids levels in watercourses, but the desirable level is nil.

In this survey suspended solids results are used as an aid in determining the type of water entering the creek. Suspended solids may lead to increased treatment requirements for water purification and may cause injuries to fish and other aquatic life.

(III) Total Kjeldahl Nitrogen

In the process of waste stabilization, nitrogen components are successively oxidized from organic nitrogen to ammonia, to nitrite and finally nitrate. The relative abundance of each of these compounds indicate the progression of waste stabilization.

The total kjeldahl nitrogen determination measures the nitrogenous matter present in a given sample except for nitrite and nitrate (which are analysed separately). Total kjeldahl indicates the presence of organic nitrogen such as proteins, amines and urea as well as nitrogen present in the form of free ammonia. The total kjeldahl nitrogen less the free ammonia represents the organic nitrogen present. Organic nitrogen is utilized in the biochemical breakdown of organic materials such as sewage.

Total kjeldahl readings of over 5 mg/l are a definite indication of sewage.

(IV) Total Phosphorus

Phosphorus occurs naturally and is an essential element for all life forms. Artificial inputs of phosphorus; however, play a significant role in promoting over-abundant algae growth which eventually impairs water quality. Excessive algae growth has been observed in lakes when the average inorganic phosphorus concentration was over 0.01 ppm.

Phosphorus is a major element in domestic and commercial waste and therefore in municipal wastes. Phosphates are used in the manufacture of detergents and fertilizers. Runoff from agricultural land or, municipal sewage entering a body of water could result in a high phosphate level.

(V) Conductivity

The conductivity of water is used to determine the amount of dissolved solids present. Most inorganic substances are good conductors while organic compounds undergo minimal ionization in aqueous solutions and are therefore, poor conductors. By multiplying the conductivity of the sample by 0.65 ± 0.10 (this figure being determined by the amount of natural dissolved solids and conductivity of most Ontario lakes) it is possible to calculate the probable level of dissolved solids in the water sample.

The permissible level for dissolved solids is 500 ppm which corresponds to a conductivity of approximately 770 umhos/cm. The desirable level for dissolved solids is less than 200 ppm. A high conductivity suggests a high level of dissolved inorganic solids.

(VI) Phenols

This analysis measures the concentration of phenols and some phenolic compounds in a sample. Phenols are generally associated with petroleum and petroleum products and are prevalent in industrial wastes.

Concentrations in excess of 1 ppb may cause taste and odour problems in drinking water or the tainting of fish flesh.

(VII) Heavy Metals

Heavy metal analysis were performed to test for the presence of copper, nickel, lead, zinc, cadmium, chromium and manganese. Of these minerals cadmium is the only one rarely found in natural waters. The presence of high levels of cadmium therefore is unusually indicative of industrial discharge or the deterioration of galvanized pipe. Lead and nickel, though more common in natural waters than cadmium, usually occur in very low concentrations. The presence of high levels of these metals is usually indicative of industrial discharge as well.

The permissible levels in surface water supplies for each of these metals are:

Copper (Cu)	- 1.0 mg/l
Lead (Pb)	- 0.5 mg/l
Zinc (Zn)	- 5.0 mg/l
Cadmium (Cd)	- 0.01 mg/l
Chromium (Cr)	- 0.05 mg/l
Manganese (Mn)	- 0.05 mg/l
Nickel (Ni)	- 1 mg/l

AESTHETIC CONDITION OF CREEK

(I) Litter

At the time of the May survey the banks and bottom of the creek were laden with human refuse and natural debris from the spring runoff. Three places along the creek were of particular note;

- 1) the area between Pearl and Vimy Avenues,
- 2) near Algonquin Blvd., in the vicinity of sample point TC-107
- 3) the bottom of the creek near Mattagami Blvd., at sample points TC-101.

The worst of the three areas was the open area between Pearl Ave., and Vimy Ave. In this area the creek was littered with wooden planks and old pipes, bricks, tar can lids, an old plastic swimming pool, green plastic garbage bags, cars, papers and natural debris. The creek in general, was a mess. The last two areas (around TC-107 and TC-101) were not as heavily littered as the Pearl - Vimy Ave. At TC-107 fencing from a nearby house was lying in the creek along with an old barrel, papers, plastics and cans. TC-101 was littered with tin cans, candy wrappers and other miscellaneous garbage, including old tires and bricks.

These three area were the worst areas encountered but they were by no means the only areas aesthetically displeasing. At all sample points along the creek garbage of one type or another was visible. Cans and paper wrappers were noted at all points along the creek and larger refuse such as bricks, planks and discarded plastics were frequently encountered as well.

Much of the garbage so noticable during the May survey was removed during the summer. Two members of the Ministry staff, examining the creek in late July, reported that virtually all of the debris had been removed. The change was remarkable! It was later ascertained that project SWEEP had cleaned the creek in June and again in July, and was responsible for the dramatic change.

The Mattagami Region Conservation Authority is presently working to develop the vacant block between Pearl Ave. and Vimy Ave., into a playground. All of the garbage noted in May was removed from this section of the creek. (The MRCA is also preparing a flood map of the entire creek and has undertaken a program to remove houses from much of the flood plain as part of improving the creek).

Despite the efforts of SWEEP and the MRCA there is still a problem with garbage in the creek. Cans, wrappers, and cigarette cartons were again noted in August, particularly below Hillside Ave.. The problem is one which may only be solved by making city residents more litter conscious or periodic garbage collecting along the creek, as was done by SWEEP.

(II) Condition of Creek Banks

The banks of the lower portion of the Town Creek are reinforced with rip rap wherever erosion of the embankment appeared to be a problem. The rip rap is of two types;

- 1) gabions (tiered levels of stones encased in wire mesh)
- 2) stone and concrete walls.

Gabiens have been used at Hillside, Pearl and Vimy Avenues and Theriault Blvd. This seems to be a very effective method of maintaining the embankment and no repair work appeared to be necessary. In a discussion with Mr. Brian Tees of the MRCA on August 27th he reported that there were some difficulties with children pulling the wire mesh out of the ground, but overall the gabions were satisfactory.

Stone and concrete walls have been used where Murray Avenue meets Brian Ave. and all along the creek from Algonquin Blvd., to the Mattagami. The stone and concrete wall at Brian Ave. is in good condition but does not extend far enough. At the point where the wall ends the embankment is caving in allowing part of the roadway to erode.

The rip rap between Algonquin Blvd., (and Fogg St.) is in good condition, there are few cracks and the concrete has not visibly shifted.

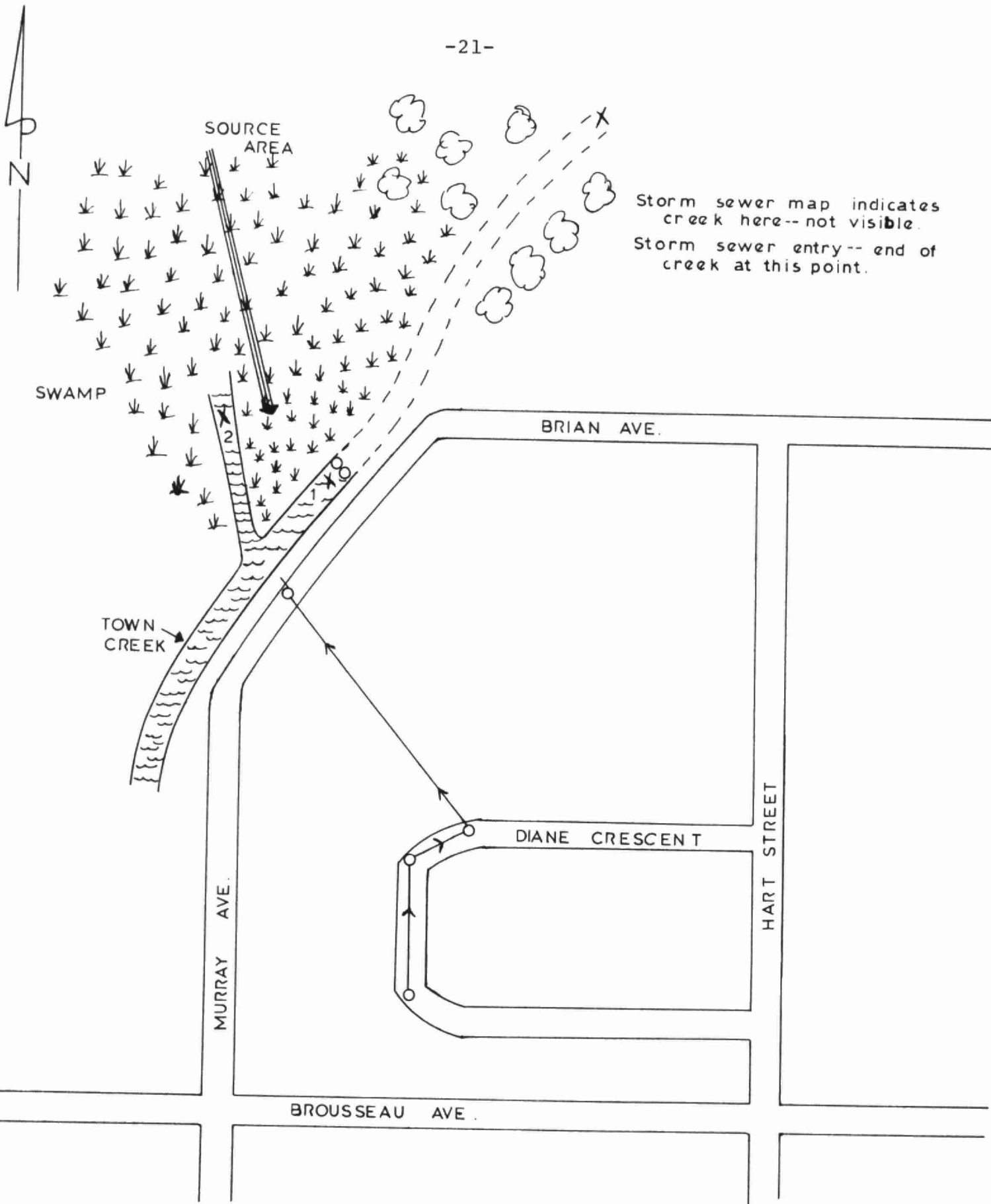
The rip rap below the Main Avenue was and is in need of repair. The cement holding the rocks in place has cracked and heaved and is slowly falling into the creek. Some of the rip rap has already fallen. At Mattagami Blvd., there is a 12" clay pipe protruding from the rip rap which should be attached to a galvanized storm sewer pipe in the ground behind it. As a result, flow from the galvanized storm sewer pipe is finding its way to the creek through the lower rip rapping as well as via the clay pipe. The rip rap in this area is very much in need of repair. A photograph showing this situation is on the next page.

Deteriorating Rip Rap
Town Creek at Mattagami Blvd.

(III) Source of Creek

Town Creek enters Timmins proper at the northwest corner of Brian Avenue. This part of the creek is largely swamp and no "creek" as such is visible. The swamp disappears into a wooded area beyond Brian Avenue; in and around the swamp to the west of Murray Ave. are tag aders and a variety of swamp vegetation. At the time of the May survey the swamp and much of the lower vegetation was covered in a rust coloured substance. The same was noted in August but to a lesser extent.

The obvious creek bed begins at two storm sewers which enter from Brian Avenue. Routine chemical, heavy metal, phenol and bacteriological samples were taken at both the swamp and the storm sewer entry points. Both sample points are considered to be part of the source area. A map of the source area has been included in the next page.



AUGUST SAMPLING

1. Routine Chemical, Heavy Metal, Phenol & Bacteria analyses. (May & August)
2. Ibid., August.

AREA OF SOURCE OF TOWN CREEK

CITY OF TIMMINS

(Sketch map, not drawn to scale)

AUGUST, 1975.

Drawn by B.A.M.

ORGANIZATION OF SAMPLE RESULTS

The discussion on sample results has been divided into seven sections for easier understanding, those sections being:

- 1) the source,
- 2) Murray Ave. to MacLean Drive,
- 3) Waterloo St. to Vimy Avenue,
- 4) H.E.P.C. line to Theriault Blvd.,
- 5) Young and Wilson culvert,
- 6) Fogg St. and Main,
- 7) Mattagami Blvd..

Under each sub-title bacteriological, routine chemical, heavy metal and phenol results are discussed. The actual bacteriological results are not mentioned in every case. For the actual bacteriological results please refer to Appendix A. In those instances where bacteriological counts are expressed they have been rounded off to the nearest hundred or thousand. This is possible since the levels are more significant than the actual numbers. There is little difference between a coliform count of 6,000 and one of 5,000, both indicate sewage.

A map of the creek with all of the sample points indicated on it has been attached to the report. For all sample point references see the map.

Unless otherwise mentioned in the analysis, all storm sewer pipes are 12" concrete pipes.

ANALYSIS RESULTS

(1) Source Area

Bacteriological Quality

Bacteriological analysis of the swamp water (TC-135) performed in May and again in August indicated that total and faecal coliform levels were within the range for normal surface water. The low levels of faecal coliforms present may be attributable to animal waste and the total coliform of decomposing vegetation in the swamp.

Routine Chemical Analysis of the swamp water indicated that it was free of human contamination. BOD₅, suspended solids, total kjeldahl and phosphorus were all low.

Analysis of the samples taken in May at TC-134 indicated that the water entering from the Brian Avenue storm sewers was healthy with respect to phenols, BOD₅, total kjeldahl, phosphorus, suspended solids and conductivity.

The heavy metal analysis performed at TC-134 revealed low concentrations of copper, lead, nickel, zinc, cadmium and chromium, all were present in quantities below the measurable levels. Manganese alone was above the lower test limit and was recorded at 0.05 ppm.

(II) Murray Avenue to MacLean Drive

Generally speaking, the storm sewers entering the creek between Murray Avenue and MacLean Drive were the cleanest of all the storm sewer sampling points. These storm sewers were relatively free of sewage.

The flow from storm sewers entering at Murray Avenue (TC-132). Pine St. (TC-127) and MacLean Drive (TC-124) had bacteriological levels well below the permissible level.

Two other storm sewers enter between Murray Ave. and MacLean Drive, these storm sewers had faecal counts above 100. The first is a storm sewer entering via a ditch from Dianne Crescent (TC-133). The second is a ditch entering between Cedar St. and MacLean Drive (TC-125).

The bacteriological counts at TC-133 were much the same during the May and August samplings, those counts being about 350,100 for total and faecal coliform. The faecal count is above the limit usually considered to indicate sewage but, in this instance may be due merely to natural ground runoff, considering the relatively low total count and the nature of the drainage area.

This storm sewer drains Diane Crescent (TC-133) which is a cul-de-sac approximately 200 yds. from the sewer outlet. Any sewage entering this storm sewer would find access to the creek very quickly, before bacterial levels would change. If sewage was entering from this area, a much higher count would be expected. Sewage dilution does not seem to be a possibility as the flow from the sewer was not excessive. In this instance the faecal count would appear to be attributable to normal urban runoff.

The second ditch, TC-125, entering between Cedar St. and MacLean Drive had bacteriological counts similar to those above; at this point the bacteriological counts may be reduced since the sewers pick-up drainage from distant sources.

This ditch drains storm sewers from Cedar, Pine, Spruce, Tamarack and Hemlock Sts. as far south as 6th Ave., as well as part of Balsam St., Empire Ave., Murdock Ave., and Toke St. in all, a very large area. In May and June the storm sewer flow was low due to the hot, dry weather.

The general mid-creek condition of Town Creek above MacLean Drive was much better in May than August. Bacteriological examinations of samples taken in May on the west side of the Tamarack St. culvert; near St. Jean Separate School; on the west side of the Spruce St. culvert; and the east side of Cedar St. showed coliform counts which were all similar and within the range for normal surface waters. In August the creek was sampled only at Spruce St. due to the low May counts and the results were higher than previously recorded. It should be noted that this sample was taken after a rain during which the storm sewers were flowing more heavily than previously observed.

The water in the ditch entering on the west side of Tamarack (TC-130) was analysed by routine chemical and bacteriological tests in May. The water entering here was brown and murky and of unknown origin. The results indicated that no sewage was present but suspended solids and the phosphorus levels were high, the readings being 1566 ppm and 1.4 ppm respectively. The source of the ditch water was a small residential area east of Hendry Avenue. The high suspended solids and phosphorus levels could have been someone washing a car in the area. The ditch was dry in August.

The good quality of the mid-creek water as indicated by the bacteriological results in May was supported by the routine chemical, and phenol analysis of the creek at sample point (TC-128). Phenol was recorded at less than 1 ppb, BOD₅ - 0.2 ppm, suspended solids - 5.8 ppm, total kjeldahl - 3 ppm, total phosphorus - .010 ppm, and conductivity - 975 μ mhos/cm.

The conductivity level indicated a higher level of suspended solids than the maximum level, but since it was the only test with results above the maximum, it alone indicates very little. The routine chemical analyses were indicative of a healthy stream. The heavy metals present in the creek water were higher at this point than those recorded at the source, but were not above the acceptable criteria. The results were:

Copper	0.02
Nickel	0.03
Lead	0.03
Zinc	0.04
Cadmium	0.01
Chromium	0.04
Manganese	0.36 ppm

The most significant increase is that of manganese from 0.05 ppm to 0.36 ppm. There is no apparent explanation for this increase. The increase in copper, lead, and zinc was originally attributed to fallout from Texasgulf but upon further investigation, this theory was abandoned. Mr. Peter Williams, District Officer for Industrial Abatement in the Timmins area, assured us that very little fallout from Texasgulf could reach Timmins. Winds, predominantly from the northwest and southwest, carry any dust from this operation to the east. It is Mr. Williams' belief that the increase in copper, lead and zinc may be due to inter-connecting sanitary and storm sewers as copper pipes and plumbing systems will cause increases in the concentrations of these metals.

(III) Waterloo Rd. to Vimy Avenue (TC-116)

Eight storm sewers enter the creek between Waterloo Rd., and Vimy Avenue (TC-122 to TC-116). Of the eight, five definitely carry sewage, two had acceptable bacteriological counts and one (TC-121B) was observed to be dry on all three sample days.

Four Storm Sewers:

- 1) TC-122 at Waterloo Rd., an 18" pipe entering from the south, and draining MacLean Drive, Elm St. and Ninth, Eight and Seventh Avenues,
- 2) TC-121 at Polaris Avenue an 18" pipe entering from the south, draining part of Waterloo St. between Lincoln and Polaris Avenues,
- 3) TC-118 at Pearl Avenue draining a small section of Rea St. between Crescent and Floral Avenues,
- 4) TC-117 at Vimy Avenue draining Vimy Avenue and Waterloo Rd., between Crescent and Vimy Avenues,

had consistently high bacteriological counts throughout the survey and all four storm sewers had total or faecal coliform present in concentrations which exceeded the count limits.

The lowest of the bacteriological counts from these sample points were recorded in June during the very dry period experienced throughout the summer. None of these counts; however, fell below the acceptable upper limit for surface waters.

A fifth storm sewer (TC-119) at Hillside Avenue which drains Hillside Avenue and Belleview St. between O'Neill and Hillside also had consecutively high counts in May, June and August. The August bacteriological count was by far the highest of the survey, but all counts were above the acceptable limit.

Excessive levels of coliform present in water samples from TC-122, TC-121, TC-119, TC-118 and TC-117 indicate that sewage is entering Town Creek at all five points. It would appear from these results that there are direct linkages between sanitary and storm sewers, or private pipes entering storm sewers.

The storm sewer which enters from the north at Waterloo Rd. (TC-122B) was only observed flowing once during the survey. On August 13th following a heavy rain the storm sewer carried a great deal of water. The count at this time was 1100,170 for total and faecal coliform. As the rain would carry most

of the ground runoff to the creek, this count is probably due to animal waste and organic matter, rather than human sewage.

The east storm sewer in this area enters the creek at Hillside Avenue (TC-120). This sewer drains Rae St., between Queen and O'Neill Avenue. The bacteriological counts were low and therefore indicative that no abnormal amounts of organic waste was entering the creek here.

As previously stated the 18" galvanized storm sewer on the north side of Polaris Avenue (TC-121B) was dry on all three sample dates.

On the east side of Waterloo St. (TC-123), at Polaris Avenue (TC-121B) and at Vimy Avenue (TC-117B) mid-creek samples were taken. The results of the bacteriological analysis at TC-123 indicated that faecal coliform were present in numbers exceeding the surface water criteria. The bacteriological results, while not as high as those at TC-121B and TC-117B, indicated that at this point sewage was being carried by the creek. Results of bacteriological examination of the samples taken from mid point of the creek at Polaris Avenue and Vimy Avenue reflect the high counts received at storm sewer outlets.

Faecal coliform counts exceeded 1000 at both points while total coliform exceeded 3000. These are very high readings for mid-creek water.

Routine chemical, phenol and heavy metal samples were taken at TC-123. Routine chemical analyses produced results which were not unusually high. Conductivity results indicated a high concentration of dissolved solids and a phosphorus level above 0.01 ppm, slightly above the preferred level.

BOD₅, total kjeldahl and suspended solids were low. Phenols were below the measurable limit. It would appear from the routine chemical results that at this point, the creek is capable of decomposing the organic matter entering it without significantly changing the water quality. However, the bacteriological examination indicates a large concentration of bacteria, bacteria which may carry disease and which are a definite indication of sewage.

Heavy metal concentrations were much the same as at sample point TC-128. Copper, nickel, lead, cadmium, chromium and manganese remained the same. Zinc decreased from a concentration of 0.04 ppm to 0.03 ppm.

H.E.P.C. Line to Theriault Blvd.

Between the north side of the H.W.P.C. line and Theriault Blvd. two storm sewers and two private pipes enter the Town Creek.

The two private pipes TC-112 and TC-111 were believed to be sump pump outlets. Both water samples had bacteriological counts of 0,0 indicating that no sewage was entering the creek through these pipes.

The first of the two storm sewers (TC-115) enters the creek via a ditch which receives flow from storm sewers on 6th Avenue, Mountjoy between Vimy and Messines Avenue part of Waterloo St., and sections of Birch, Fifth and Cedar. The flow from these storm sewers, as indicated by the ditch sample is definitely carrying sewage. Coliform counts exceeded the test limits on two of the sampling days, and were consecutively high throughout the survey.

The water entering at this point is not clear and black deposits which looked like raw sewage were noted in waters in the creek bed.

A second storm sewer enters the creek from the middle of the H.E.P.C. line (TC-113). There does not appear to be an outflow pipe from the storm sewer to the creek. Erosion marks on the bank indicate where the storm sewer overflow finds its way to the creek. The sample was of necessity, taken at the creek edge not far below TC-114. The results were high, but due to the higher counts received from a mid-creek sample taken 15' upstream of TC-113, it cannot be concluded that sewage enters at this point.

Mid-creek samples taken at the north corner of the H.E.P.C. line (TC-114) were extremely high averaging about 14,000, 2200 over the survey. Another mid-creek sample was taken in August just north of Theriault Blvd. The results of this bacteriological analysis were, once again, very high, exceeding the criteria for surface waters.

Routine chemical analysis at TC-114 indicated a high suspended solids, phosphorus and conductivity levels as well as a kjeldahl nitrogen reading above the acceptable limit.

The routine chemical analysis therefore indicated that sewage was present in mid-stream. Phenols were present at less than 1 ppb, and are not considered as a problem at this location of the Town Creek.

The concentrations of copper, nickel, and zinc increased slightly while the concentration of manganese decreased from samples taken upstream.

IV) Theriacult Blvd. - Algonquin Blvd. Culvert

The culvert which runs under Theriacult Blvd. and Algonquin Blvd., west has eight pipe entries. Only four of these pipes had any flow during the survey, one of which was only observed flowing once (water on the culvert wall; however, indicated that this storm sewer was not completely dry on other occasions). The other four pipes did not appear to be in use any longer. Of the four storm sewers tested not one was free of faecal contamination.

The Four Storm Sewers:

- 1) TC-110 entering from the north, draining all of Theriacult Blvd.,
- 2) TC-109B entering from the north, apparently draining some of Theriacult Blvd. (no storm sewer is indicated at this point on the storm sewer map),
- 3) TC-109 entering from the north, draining part of Charles St. and Avenue Rd. (no flow in May),
- 4) TC-108 a 24" galvanized pipe entering from the south, draining all of Algonquin Blvd. east and west

had bacteriological counts well above the criteria surface water in Ontario.

The June count at TC-108 was extremely high recording coliform levels above the count limit. At various times during the survey all of these pipes discharged water with high bacterial levels.

Just outside the culvert on the south end, a fifth storm sewer enters from the north draining one block of Algonquin Blvd., west (TC-107).

Only one count was taken as there was no flow on August 13th and in June men were working on Algonquin Blvd., directly above the storm sewer. The May count was 17,000 and 360 indicative of bacterial contamination.

The high bacteriological counts of the water samples taken from these storm sewers was reflected in a mid-creek water sample taken at (TC-107B) in August. The mid-creek water had a total and faecal coliform count of 21,000 and 3200 again extremely high results for mid-creek water.

V) Young & Wilson Culvert

Three storm sewers enter the Young and Wilson culvert, and all three carry bacteriologically contaminated water. Two of these recorded bacteriological counts which exceeded the count limit.

A small 9" steel pipe enters at road level at the north end of the culvert (TC-106). The rip rap below the pipe was wet on all three occasions, but only once was the flow great enough to sample. This sample was taken in May at which time the count was 51,000 and 2,000. It should be noted that no storm sewer enters this point according to the storm sewer map. This pipe may be a private pipe, entering from buildings on Young St.

The storm sewer draining on Wilson Avenue (TC-105) enters in the middle of the culvert from the east. Flow was constant over the summer but not great enough for a direct sample. The sample was taken below the pipe throughout the survey. Bacteria was present in one sample in quantities well beyond the count limit.

The third storm sewer is a 2' concrete pipe (TC-104) entering from the east at the south end of the culvert. All counts were high indicating faecal contamination.

VI) Fogg St. and Main

The culvert under Fogg St. is a large diameter galvanized pipe. Running parallel to the culvert outside the pipe near it's base are two 6" pipes (one on either side). There was an outflow from both pipes which left a rust coloured scale-like, deposit on the creek bed. The origin of these pipes is unknown but it is suspected that they may be relief drains for the culvert. Analysis of water from the west pipe yielded very high counts.

A storm sewer enters the culvert from the north off Fogg St. (TC-103). The bacteriological results of samples taken below the pipe were consecutively high throughout the survey.

There are two private pipes which enter the creek at Main Ave. One of the pipes, a 3" steel pipe appears to be coming from a house on Main Avenue, probably from a sump pump. Flow was only noted once at this point and was insufficient for sampling. Flow from the second pipe, a 12" pipe entering from the east at the road wall was also insufficient for sampling.

A mid-creek sample was taken below Main Avenue at TC-102. The counts were extremely high with the total coliform count exceeding the count limit. All of the bacteriological results taken in this area indicate that the creek was highly polluted with bacteria.

VII) Mattagami Blvd.

The cracked clay storm sewer pipe which enters the creek on the east side of Mattagami Blvd. (TC-101) was sampled in August only as the previous flow was insufficient. The count at that time was 80,000⁺, 6,000, highly indicative of sewage.

The next sample point was mid-creek just above the point where the storm sewer enters. This sample showed somewhat unusual results. Fifty feet above this sample point mid-creek results were 80,000⁺, 6,000 and 20' below TC-101 the sample results were 80,000⁺, 5,300. At TC-101 the August count was 2,000,80. There would appear to be some error either in the sampling itself or in laboratory testing. In view of the mid-creek results above and below this point the August sample must be discounted. Earlier results at this point were much higher and in keeping with the other results obtained.

The Town Creek, just before it enters the Mattagami, (TC-101C) had a total and faecal count of 80,000⁺, 5,300. When the Town Creek enters the Mattagami it is highly contaminated with faecal and total coliform.

Routine chemical analysis at TC-101C taken in August indicated that the quality of the creek water had deteriorated compared to the quality at the source. BOD₅ was 5.0 total kjeldahl - 0.60 ppm, total phosphorus - 0.028 ppm and conductivity was 820 umhos/cm, all results much higher than the source results. Phenols were low once again, recorded at less than 1 ppb.

Heavy metal concentrations of copper, nickel and zinc increased over the concentration at TC-114, manganese and lead concentrations decreased.

RESULTS COMPARISON TO 1972 SURVEY

At all sample points used in the 1975 survey where the location was the same as that used in the 1972 survey, sample results were compared. The majority of results were comparable with the exception of 7 storm sewers.

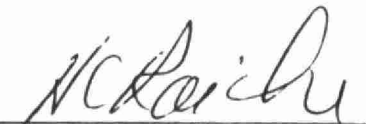
Of the twenty-three sample locations compared, fourteen had similar results. Seven storm sewers TC-122, TC-121, TC-119, TC-118, TC-108, TC-102 and TC-101A all had bacteriological counts generally much higher than those recorded in 1972. The remaining sample point TC-120 was only tested once in 1975 as the total faecal coliform counts were well below the acceptable level. The 1972 results were much higher and indicated sewage.

RECOMMENDATIONS

(1) Those pipes which have been identified as probable private drains to the creek should be fully investigated to ensure that contaminated waste water cannot be directed to the creek. When the source of the pipe is known, a complete inspection of all connected plumbing should be undertaken to ensure that there are no illegal hook-ups.

(2) The City forces should set-up a programme of systematic monitoring of the storm sewer system (commencing with those sewers with evidence of contamination) so that all sources of domestic, commercial or industrial waste water will be found. These services should be disconnected from the storm sewer and be redirected into the sanitary sewer system.

Prepared by:


Judy Hembruff
Environmental Officer

Approved by:


G. W. Scott
District Officer

APPENDIX I

Bacteriological Sample Results

(May, June and August Samplings 1975)

- all results in bacteria per 100 mls

SAMPLE NUMBER	LOCATION	TOTAL MAY	FAECAL MAY	TOTAL JUNE	FAECAL JUNE	TOTAL AUG.	FAECAL AUG.
TC-100	Mattagami River slightly upstream of Town Creek entry point	140	52			450	10
TC-100B	Mattagami River slightly downstream of Town Creek entry					40000	630
TC-100C	Town Creek just before entry					80,000 ⁺	5300
TC-101	East Side of Mattagami Blvd., 20' upstream of bridge, 1' upstream of storm sewer entry mid-creek	7,000	2,000	4500	900	2,000	80
TC-101	Storm sewer flow					80,000 ⁺	6000
TC-102	Northend of Main Ave. Culvert, 1' downstream of pipes entering creek	3,000	700			80,000 ⁺	3800
TC-103	West end of Fogg St., culvert 1' downstream of storm sewer entrance	25,000	1,700	2900	1300	80,000 ⁺	5200
TC-103B	Pipe parallel to culvert					77,000	4700
TC-104	Young and Wilson culvert southwest end sample from 2' pipe which enters here (labelled N-1)	43,000	1,000	39,000	8000 ⁺	3400	84
TC-105	Young and Wilson culvert middle, sample taken 1' downstream from storm sewer entry (labelled M-1)	41,000	2,000	415	40	80,000 ⁺	3100
TC-106	Young and Wilson culvert northeast end, sample from 1' pipe entering here (labelled 1)	51,000	2,000	no	flow	no	flow
TC-107	Algonquin Blvd. culvert east end storm sewer entry 1' downstream of pipe	17,000	360	men working	no		flow
TC-107B	Mid-Creek					21,000	3200
TC-108	Algonquin Blvd., south east end 24" storm sewer pipe enters from Algonquin sample of outflow (labelled H)	3200	1500	80,000 ⁺	8,000 ⁺	25,000	300

SAMPLE NUMBER	LOCATION	TOTAL MAY	FAECAL MAY	TOTAL JUNE	FAECAL JUNE	TOTAL AUG.	FAECAL AUG.
TC-109	Algonquin Blvd., culvert, storm sewer entry from Charles St., sample taken pipe outflow (labelled I)	no	flow	6800	600	23,000	3900
TC-109B	Algonquin Blvd., culvert, storm sewer entry possible origin Theriault Blvd. 1' pipe (labelled G) pipe outflow	1500	1200	no	flow	no	flow
TC-110	Algonquin Blvd., culvert, northwest side of Theriault Blvd., 2' storm sewer pipe entry	1000	800	155	16	4200	2200
TC-110A	Mid-creek					22,000	3600
TC-111	Residential area past Theriault Blvd. up- stream of TC-110 private pipe entry from northwest pipe outflow	0	0				
TC-112	Private pipe 6' upstream of TC-111, private residence probably sump pump sample from pipe	0	0				
TC-113	H.E.P.C. line, storm sewer entry but no pipe found eroded trenches found for storm sewer cover sample taken in stream below outflow	5000	2300	8,000	600	13,000	3800
TC-114	H.E.P.C. line - north- west corner of lot - all samples taken here mid-stream	3700	2300	10,000	800	29,000	3500
TC-115	Creek entering Town Creek from northwest below Vimy Ave. sample from entry creek	2500	1000	80,000 ⁺	8,000 ⁺	80,000 ⁺	8,000 ⁺
TC-116	Vimy Ave. storm sewer entry from west, no water near pipe, sample from creek mid-creek	1300	600	520	30	3300	3300
TC-117	Vimy Ave. storm sewer entry from east from pipe	80,000 ⁺	8,000 ⁺	790	200	3100	1800

SAMPLE NUMBER	LOCATION	TOTAL MAY	FAECAL MAY	TOTAL JUNE	FAECAL JUNE	TOTAL AUG.	FAECAL AUG.
TC-118	Pearl Ave., storm sewer entry from east 1' downstream of pipe	2400	800	1,100	500	68,000	8000 ⁺
TC-119	Hillside Ave. storm sewer entry from east 1' downstream of pipe	1300	100	1,900	600	6,500	3000
TC-120	Rea St. culvert, north of Hillside Ave- west entry of storm sewer 1' downstream	250	58				
TC-121	Polaris Ave. culvert south end storm sewer enters, flow sample (no flow from northend storm sewer)	3300	2,300	4,400	4400	80,000 ⁺	8000 ⁺
TC-121B	Mid-Creek					3100	1300
TC-122	Waterloo St, south west side of bridge storm sewer entry from south sample of pipe flow(storm sewer entry from north, no sample taken)	20,000	7,500	185	40	80,000 ⁺	8000 ⁺
TC-122B	North entry of storm sewer					1100	170
TC-123	Waterloo St. northeast side of bridge at 402 Waterloo St. all samples taken in mid-stream	145	130			1400	310
TC-124	MacLean Drive storm sewer entry from north sample taken from out- flow	155	60				
TC-125	Ditch entry between Cedar St. and MacLean Drive 6" depth when sampled	290	130	90	64		
TC-126	Cedar St. east side, no storm sewer found, sample taken in mid- stream	30	20				
TC-127	Pine St. culvert, storm sewer entry on west side, sample for outflow	45	0				
TC-128	Spruce St. culvert, west side, stream sample	36	36			1600	290

SAMPLE NUMBER	LOCATION	TOTAL MAY	FAECAL MAY	TOTAL AUG.	FAECAL AUG.
TC-129	Creek splits, flood plain beside St. Jean Separate School - comes together at sample point stream sample	155	38		
TC-130	Tamarack culvert, west side, ditch entry from Hendry Ave.	180	56		
TC-131	Tamarack culvert, west side, sample	60	12		
TC-132	Murray Ave. storm sewer entry into ditch enters creek, sample taken from creek	20	10		
TC-133	Storm sewer entry past sample point TC-132 from Diane Crescent	305	150	380	58
TC-134	Storm sewers enter off Murray Ave just before it meets Brian Ave. west entry, east entry	0	0	3900 65 205	2100 0 84
TC-135	Swamp surrounding creek source - sample taken where swamp becomes creek - swamp flow into creek	10	10	215	64

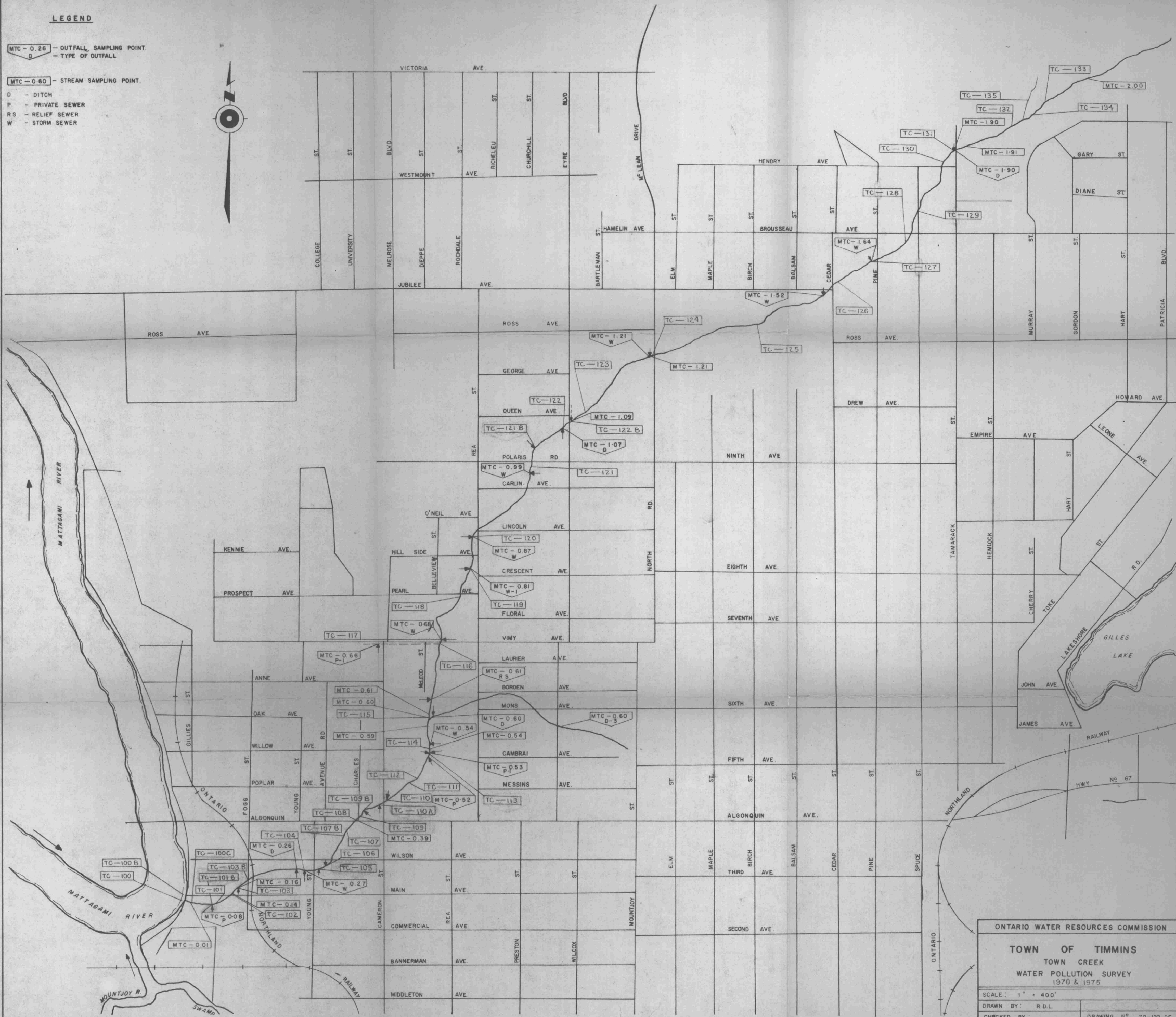
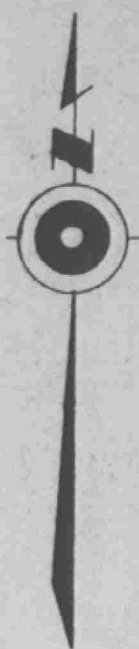
APPENDIX II

Chemical Analysis Results

TOWN CREEK - CHEMICAL ANALYSIS RESULTS
(All results are mg/l unless noted)

SAMPLE LOCATION	PHENOLS (ppb)	BOD ₅	SUSPENDED SOLIDS	TOTAL KJELDAHL as N	TOTAL PHOSPHORUS	CONDUCTIVITY umhos/cm	HEAVY METALS		Ni	Pb	Zn	Cd	Cr	Mn
							Cu							
TC-101 E. Side of Mattagami Blvd.	<1	0.4	6.0	.39	.018	980	—	—	—	—	—	—	—	—
TC-100 Mattagami River	—	0.4	9.2	.35	.018	94	—	—	—	—	—	—	—	—
TC-114 HEPC Line N.E. Corner of Lot.	<1	1.0	88.5	.52	.094	960	.03	.03	.03	.06	.01	.04	.20	
TC-122 Waterloo St. N.E. Side of Bridge	<1	0.2	7.3	.35	.012	970	.02	.02	.03	.03	.01	.04	.36	
TC-128 W. Side of Spruce St.	<1	0.2	5.8	.30	.010	975	.02	.02	.03	.04	.01	.04	.36	
TC-130 W. Side of Tamarack	—	2.0	1566	2.3	1.4	180	—	—	—	—	—	—	—	—
TC-134 Murray Ave. Before Brian	<1	0.8	4.6	.58	.027	580	<.01	<.02	.01	<.01	<.01	<.04	.05	

D - DITCH
P - PRIVATE SEWER
RS - RELIEF SEWER
W - STORM SEWER



SCALE : 1" = 400'	
DRAWN BY : R.D.L.	
CHECKED BY :	DRAWING NO 70-122 DE



96936000119907

Date Due

[illegible]

LAB